

① Find the direction \vec{u} parallel to $\langle 4, -3 \rangle$. HW25

Then compute $D_{\vec{u}} f(1, 2)$ and $D_{\vec{u}} g(5, 6)$

where $f(x, y) = \sin(xy)$ & $g(x, y) = \ln(r)$.

② Find the direction \vec{v} parallel to $\langle 2, -4, 5 \rangle$.

Then compute $D_{\vec{v}} f(3, 2, 1)$ and $D_{\vec{v}} g(-1, 1, 1)$

where $f(x, y, z) = \varphi$ and $g(x, y, z) = \theta$.

(In ①, ②, r & θ are polar coordinates
and φ is a spherical coordinate.)

② Hint: $\frac{d}{du} \cos^{-1} u = \frac{-1}{\sqrt{1-u^2}}$